



Title of Invention: RUSH HOUR MODELING FOR ROUTING AND SCHEDULING

Inventor(s) Name: Heaps, et al.

Application No.: 10/828,850

Attorney Docket No.: 018360.260844

REPLACEMENT SHEETS

**SAMPLE SET OF MODIFIED RUSH HOUR TRAVEL SPEEDS**

<b>GEOGRAPHIC AREA/ROAD SEGMENT</b>	<b>NORMAL TRAVEL SPEED</b>	<b>TRAVEL SPEED DURING TIME WINDOW #1</b>	<b>TRAVEL SPEED DURING TIME WINDOW #2</b>	<b>TRAVEL SPEED DURING TIME WINDOW #3</b>
<b>ROAD 1 IN AREA 1</b>	45 mph	31.5 mph (30% SLOWER)	36 mph (20% SLOWER)	31.5 mph (30% SLOWER)
<b>ROAD 2 IN AREA 1</b>	50 mph	35 mph (30% SLOWER)	40 mph (20% SLOWER)	35 mph (30% SLOWER)
<b>ROAD SEGMENT X</b>	30 mph	20 mph (30% SLOWER)	0 mph (TRAVEL RESTRICTION)	20 mph (30% SLOWER)
<b>ROAD SEGMENT Y</b>	65 mph	45.5 mph (30% SLOWER)	0 mph (TRAVEL RESTRICTION)	45.5 mph (30% SLOWER)
<b>ALL AREAS AND ROADS TO WHICH NO NEW TRAFFIC RULES WERE DEFINED TO APPLY.</b>	<b>NORMAL SPEED</b>	<b>NORMAL SPEED</b>	<b>NORMAL SPEED</b>	<b>NORMAL SPEED</b>

**FIG. 1**

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TRAVEL MATRIX FOR "NORMAL" TRAFFIC CONDITIONS

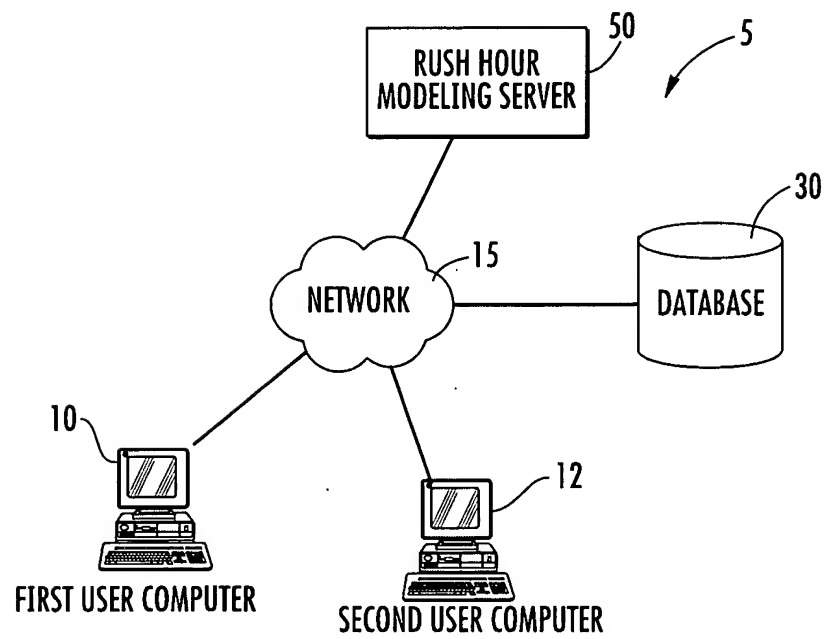
	LOCATION 1	LOCATION 2	LOCATION 3	LOCATION 4
LOCATION 1	----	10 minutes	15 minutes	20 minutes
		2 miles	3 miles	4 miles
LOCATION 2	10 minutes	----	5 minutes	10 minutes
	2 miles		1 mile	2 miles
LOCATION 3	15 minutes	5 minutes	----	5 minutes
	3 miles	1 mile		1 mile
LOCATION 4	20 minutes	10 minutes	5 minutes	----
	4 miles	2 miles	1 mile	

FIG. 2A

TRAVEL MATRIX FOR A PARTICULAR TIME WINDOW  
WITH A 20% SLOWER SPEED VARIATION

	LOCATION 1	LOCATION 2	LOCATION 3	LOCATION 4
LOCATION 1	----	15 minutes	18 minutes	24 minutes
		3 miles	3 miles	4 miles
LOCATION 2	15 minutes	----	6 minutes	15 minutes
	3 miles		1 mile	2 miles
LOCATION 3	18 minutes	6 minutes	----	6 minutes
	3 miles	1 mile		1 mile
LOCATION 4	24 minutes	15 minutes	6 minutes	----
	4 miles	2 miles	1 mile	

FIG. 2B



**FIG. 3**

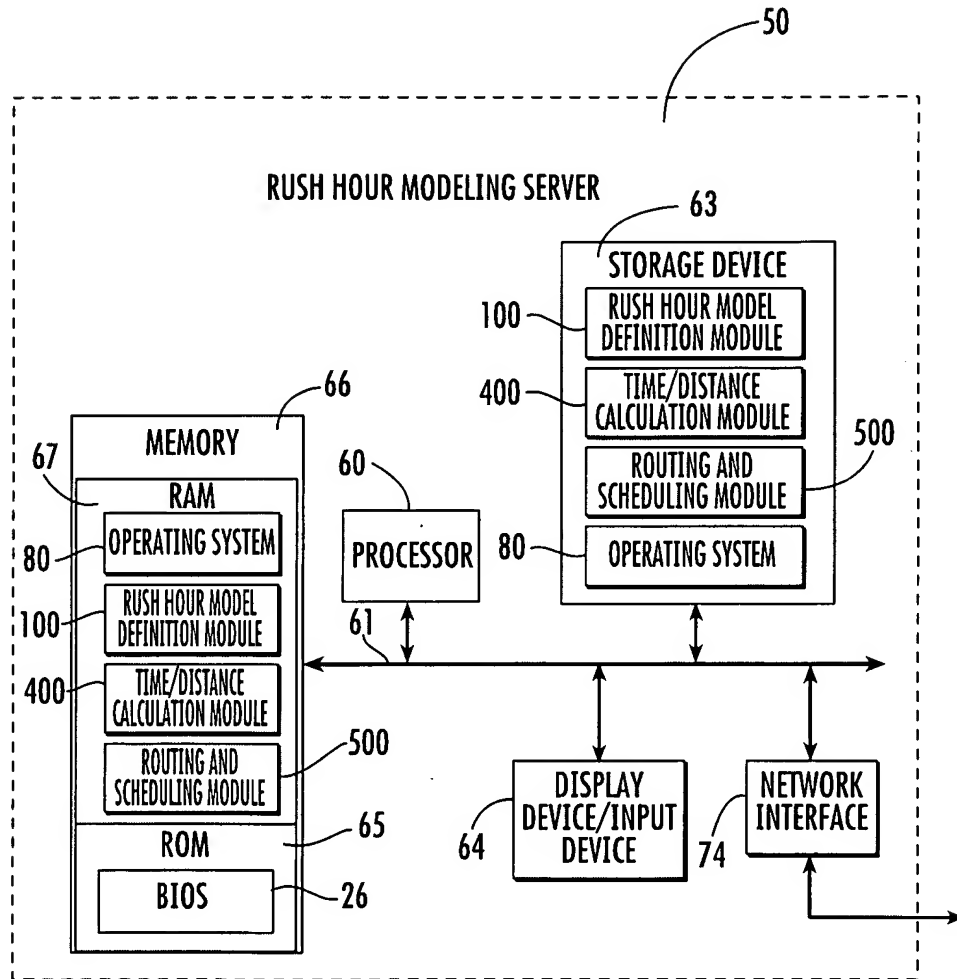
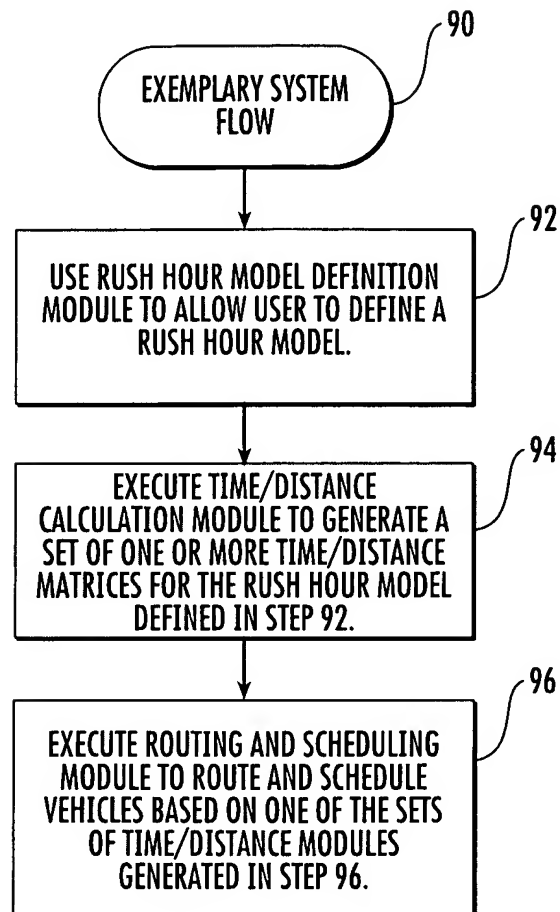
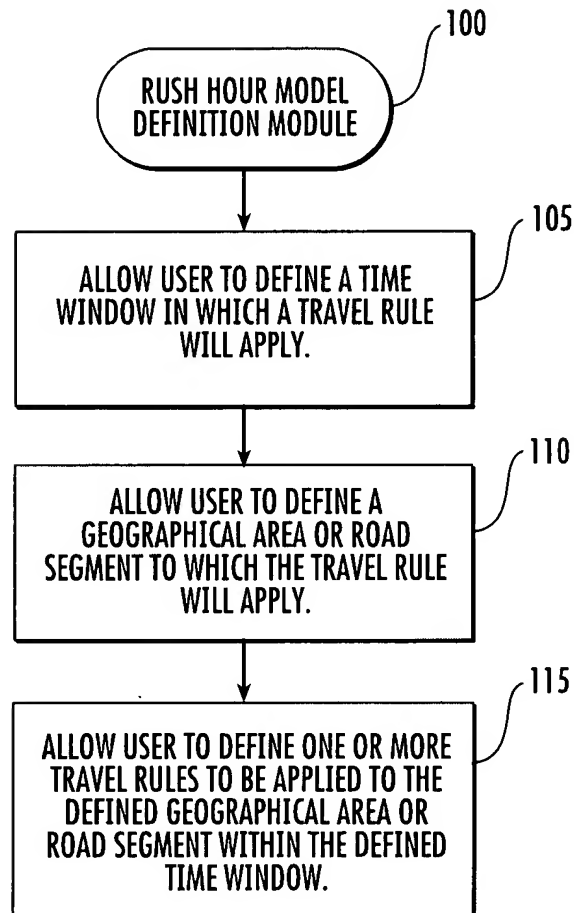


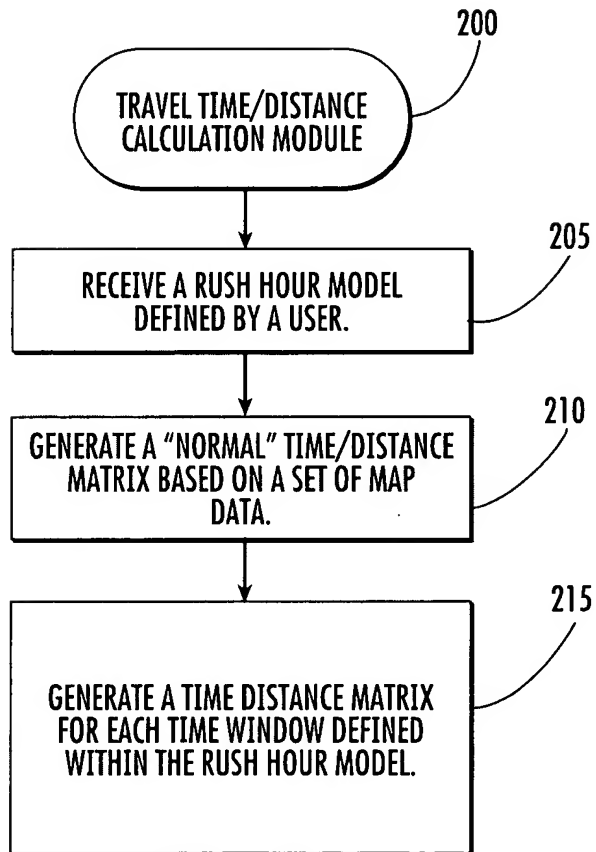
FIG. 4



**FIG. 5**



**FIG. 6**



**FIG. 7**

☒ EDIT RUSH HOUR MODEL/1 OF 1 RECORD(S) [?] [X]

Name **602** Description **604**

Summer Summer rush hour in central MD

**606** Time Period 1

☒ Enable

Name **608** Start **610** End **612** Global Speed Variation

Morning 6:00 9:00 ☒ 15 % ☐ Faster ☒ Slower **618**

**614** **616**

Time Period 2

☐ Enable

Name Start End Global Speed Variation

Midday 11:00 13:00 ☒ 0 % ☐ Faster ☒ Slower

Time Period 3

☒ Enable

Name Start End Global Speed Variation

Afternoon 16:00 19:00 ☒ 25 % ☐ Faster ☒ Slower

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FIG. 8



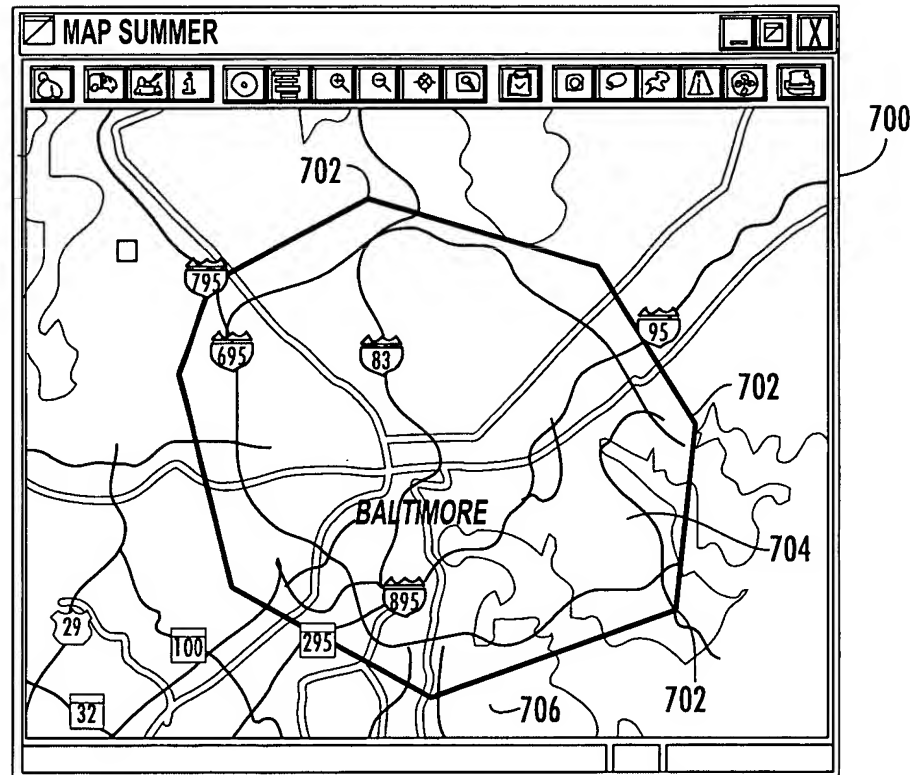


FIG. 9

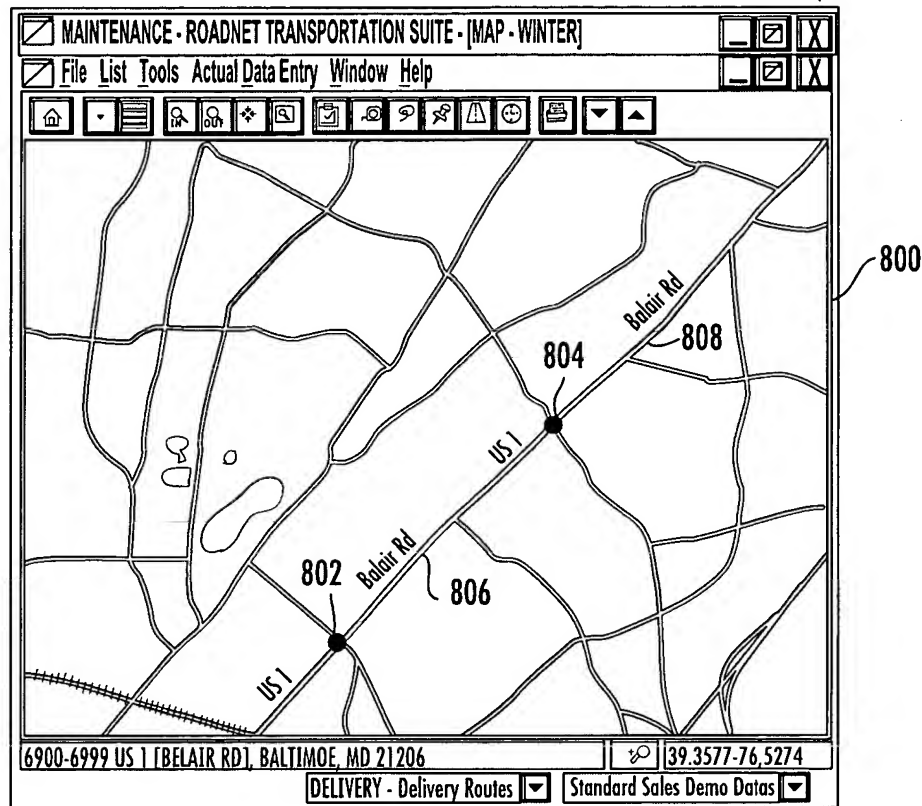


FIG. 10

**RUSH HOUR AREA ATTRIBUTES-WINTER**

Name **902** Description **916** Priority **914**

Baltimore Metro Baltimore 1

☒ Simple **905** ☐ Advanced

**904** SPEED VARIATION ADVANCED SPEED VARIATION TRAVEL RESTRICTION

**906** Time Period 1 Time Period 2 Time Period 3

06:00 - 09:00 16:00 - 19:00 Not Enabled

SPEED VARIATION

☒ 40 % ☐ Faster ☒ 35 % ☐ Faster ☐ 0 % ☐ Faster

☒ Slower ☒ Slower ☒ Slower

**908** **910** **912**

OK CANCEL

**900**

FIG. 11

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☒ RUSH HOUR AREA ATTRIBUTES-WINTER ? X

Name	Description	Priority
Baltimore	Metro Baltimore	1

☐ Simple ☒ Advanced

**SPEED VARIATION** **ADVANCED SPEED VARIATION** **TRAVEL RESTRICTION**

	Time Period 1 Not Enabled	Time Period 2 16:00 - 19:00	Time Period 3 Not Enabled
Interstate	<input checked="" type="checkbox"/> 45 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 40 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower
Primary	<input checked="" type="checkbox"/> 30 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 03 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower
Secondary	<input checked="" type="checkbox"/> 20 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 20 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower
Local	<input checked="" type="checkbox"/> 10 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 10 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower

FIG. 12

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☒ RUSH HOUR PATH ATTRIBUTES-WINTER

Name	Description
I-795	I-795 WEST

Morning 06:00 - 09:00 1104    Midday Not Enabled    Afternoon 16:00 - 19:00

SPEED VARIATION 1112

<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input type="checkbox"/> 0 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower	<input checked="" type="checkbox"/> 30 % <input type="radio"/> Faster <input checked="" type="radio"/> Slower
---	---	---

TRAVEL RESTRICTION 1110

<input type="checkbox"/> Restricted	<input checked="" type="checkbox"/> Restricted 1106	<input type="checkbox"/> Restricted 1108
-------------------------------------	---	--

TRAVEL DIRECTION 1114


<input checked="" type="radio"/> No Change <input type="radio"/> Both Ways <input type="radio"/> One Way: A to B <input type="radio"/> One Way: B to A	<input checked="" type="radio"/> No Change <input type="radio"/> Both Ways <input type="radio"/> One Way: A to B <input type="radio"/> One Way: B to A	<input checked="" type="radio"/> No Change <input type="radio"/> Both Ways <input type="radio"/> One Way: A to B <input type="radio"/> One Way: B to A
---	---	---

OK CANCEL

FIG. 13

1200

☒ EDIT EQUIPMENT TYPE / 1 OF 1 RECORD(S) ? X

 1201

General Fleetloader

Type ID  Description 24 FT ST 1204

General Info

Weight	Height
<input type="text" value="0.0000"/>	<input type="text" value="9,999.9999"/>

Cost Info

Fixed	Variable
<input type="text" value="0.0010"/>	<input type="text" value="1.0000"/>

1206

Sizes	Frozen	Dry	Refrig
Cases <input type="text" value="500"/>	<input type="text" value="1"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Weight <input type="text" value="500"/>	<input type="text" value="2"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Cube <input type="text" value="12,500"/>	<input type="text" value="3"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

1212

☒ Prohibited from Restricted Rush Hour Areas and Paths

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1210

FIG. 14

☒ RUSH HOUR AREA ATTRIBUTES-WINTER

Name

Metro Baltimore

Description

Area enclosing Balt. Beltway

Priority

0

☐ Simple

☒ Advanced

SPEED VARIATION

ADVANCED SPEED VARIATION

TRAVEL RESTRICTION

Road Class

Interstate

Primary

Secondary

Local and Ramps

Morning  
06:00 - 09:00

Midday  
Not Enabled

Afternoon  
16:00 - 19:00

☐ Restricted

☒ Restricted

☒ Restricted

☒ Restricted

☐ Restricted

☐ Restricted

☐ Restricted

☐ Restricted

☐ Restricted

☒ Restricted

☒ Restricted

☒ Restricted

OK

CANCEL

CANCEL

A check on this page means restricted equipment types cannot use roads of that class during the time period

OK

CANCEL

FIG. 15

1400

☒ EDIT ROUTING SESSION / 1 OF 1 RECORD(S) ? X

Planned Delivery Date: 2/7/2003 1402 Scenario: DELIVERY 1404

Description: Delivery 1406

Time/Distance Calculation

☐ XY ☐ Use Barrels

☒ RouteNet ☒ Advanced Rush Hour (consider alternative streets)

Rush Hour Model: Winter 1410

☒ Combine Orders ☐ DOT Tracking

Valid Delivery Days

M	T	W	R	F	S	U
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

1414

Ready 1412 Modified by ADMIN on 2/8/2003 10:11

FIG. 16



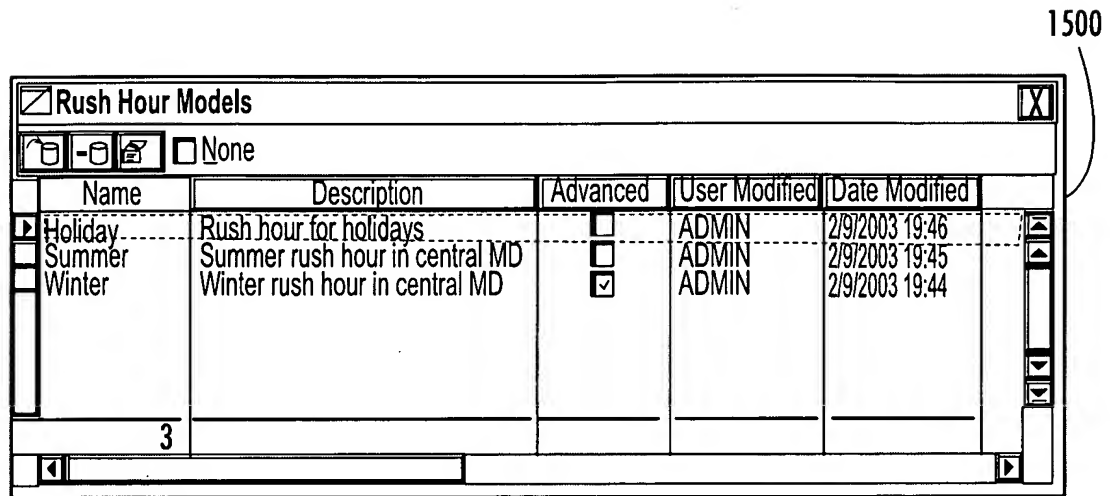


FIG. 17